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RAW SEQUENCE LISTING PATENT APPLICATION US/09/026,400

DATE: 08/06/1999
TIME: 13:30:23

Input Set: I026400.RAW

This Raw Listing contains the General Information
Section and up to first 5 pages.

ENTERED

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1  <110> APPLICANT: MORI, Satoshi
2      NAKANISHI, Hiromi
3      TAKAHASHI, Michiko
4  <120> TITLE OF INVENTION: Nicotianamine Aminotransferase and Gene Therefor
5  <130> FILE REFERENCE: 2185-0226P
6  <140> CURRENT APPLICATION NUMBER: US/09/026,400
7  <141> CURRENT FILING DATE: 1998-02-19
8  <150> EARLIER APPLICATION NUMBER: 09-037499 JAPAN
9  <151> EARLIER FILING DATE: 1997-02-21
10 <160> NUMBER OF SEQ ID NOS: 7
11 <170> SOFTWARE: PatentIn Ver. 2.0
12 <210> SEQ ID NO 1
13 <211> LENGTH: 1660
14 <212> TYPE: DNA
15 <213> ORGANISM: Hordeum vulgare
16 <220> FEATURE:
17 <221> NAME/KEY: CDS
18 <222> LOCATION: (62)..(1444)
19 <400> SEQUENCE: 1
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21      a atg gta cac cag agc aac ggc cac ggc gag gcc gcc gcc gcc gcc gcc 109
22      Met Val His Gln Ser Asn Gly His Gly Glu Ala Ala Ala Ala Ala Ala
23          1          5          10          15
24      aac ggc aag agc aac ggg cac gcc gcc gcc gcg aac ggc aag agc aac 157
25      Asn Gly Lys Ser Asn Gly His Ala Ala Ala Ala Asn Gly Lys Ser Asn
26          20          25          30
27      ggg cac gcg gcg gcg gcg gcg gtg gag tgg aat ttc gcc cgg ggc aag 205
28      Gly His Ala Ala Ala Ala Ala Val Glu Trp Asn Phe Ala Arg Gly Lys
29          35          40          45
30      gac ggc atc ctg gcg acg acg ggg gcg aag aac agc atc cgg gcg ata 253
31      Asp Gly Ile Leu Ala Thr Thr Gly Ala Lys Asn Ser Ile Arg Ala Ile
32          50          55          60
33      cgg tac aag atc agc gcg agc gtg gag gag agc ggg ccg cgg ccc gtg 301
34      Arg Tyr Lys Ile Ser Ala Ser Val Glu Glu Ser Gly Pro Arg Pro Val
35          65          70          75          80
36      ctg ccg ctg gcc cac ggt gac ccg tcc gtg ttc ccg gcc ttc cgc acg 349
37      Leu Pro Leu Ala His Gly Asp Pro Ser Val Phe Pro Ala Phe Arg Thr
38          85          90          95
39      gcc gtc gag gcc gaa gac gcc gtc gcc gcc gcg ctg cgc acc ggc cag 397
40      Ala Val Glu Ala Glu Asp Ala Val Ala Ala Ala Leu Arg Thr Gly Gln
41          100          105          110
42      ttc aac tgc tac gcc gcc ggc gtc ggc ctc ccc gcc gca cga agc gcc 445
43      Phe Asn Cys Tyr Ala Ala Gly Val Gly Leu Pro Ala Ala Arg Ser Ala
44          115          120          125

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Input Set: I026400.RAW

| | | |
|----|---|------|
| 45 | gta gca gag cac ttg tca cag ggc gtg ccc tac aag cta tcg gcc gac | 493 |
| 46 | Val Ala Glu His Leu Ser Gln Gly Val Pro Tyr Lys Leu Ser Ala Asp | |
| 47 | 130 135 140 | |
| 48 | gac gtc ttc ctc acc gcc ggc gga act cag gcg atc gaa gtc ata atc | 541 |
| 49 | Asp Val Phe Leu Thr Ala Gly Gly Thr Gln Ala Ile Glu Val Ile Ile | |
| 50 | 145 150 155 160 | |
| 51 | ccg gtg ctg gcc cag act gcc ggc gcc aac ata ctg ctt ccc cgg cca | 589 |
| 52 | Pro Val Leu Ala Gln Thr Ala Gly Ala Asn Ile Leu Leu Pro Arg Pro | |
| 53 | 165 170 175 | |
| 54 | ggc tat cca aat tac gag gcg cga gcg gca ttc aac aag ctg gag gtc | 637 |
| 55 | Gly Tyr Pro Asn Tyr Glu Ala Arg Ala Ala Phe Asn Lys Leu Glu Val | |
| 56 | 180 185 190 | |
| 57 | cgg cac ttc gac ctc atc ccc gac aag ggg tgg gag atc gac atc gac | 685 |
| 58 | Arg His Phe Asp Leu Ile Pro Asp Lys Gly Trp Glu Ile Asp Ile Asp | |
| 59 | 195 200 205 | |
| 60 | tcg ctg gaa tcc atc gcc gac aag aac acc acc gcg atg gtc atc ata | 733 |
| 61 | Ser Leu Glu Ser Ile Ala Asp Lys Asn Thr Thr Ala Met Val Ile Ile | |
| 62 | 210 215 220 | |
| 63 | aac cca aac aat ccg tgc ggc agc gtt tac tcc tac gac cat ctg gcc | 781 |
| 64 | Asn Pro Asn Asn Pro Cys Gly Ser Val Tyr Ser Tyr Asp His Leu Ala | |
| 65 | 225 230 235 240 | |
| 66 | aag gtc gcg gag gtg gca agg aag ctc gga ata ttg gtg atc gct gac | 829 |
| 67 | Lys Val Ala Glu Val Ala Arg Lys Leu Gly Ile Leu Val Ile Ala Asp | |
| 68 | 245 250 255 | |
| 69 | gag gtt tac ggc aaa ctg gtt ctg ggc agc gcc ccg ttt atc ccg atg | 877 |
| 70 | Glu Val Tyr Gly Lys Leu Val Leu Gly Ser Ala Pro Phe Ile Pro Met | |
| 71 | 260 265 270 | |
| 72 | ggc gtc ttt ggg cac att gcc ccg gtc ttg tcc att gga tct ctg tcc | 925 |
| 73 | Gly Val Phe Gly His Ile Ala Pro Val Leu Ser Ile Gly Ser Leu Ser | |
| 74 | 275 280 285 | |
| 75 | aag tcg tgg ata gtg cct gga tgg cga ctt gga tgg gtg gcg gtg tac | 973 |
| 76 | Lys Ser Trp Ile Val Pro Gly Trp Arg Leu Gly Trp Val Ala Val Tyr | |
| 77 | 290 295 300 | |
| 78 | gac ccc aca aag att tta gag aaa act aag atc tct acg tct att acg | 1021 |
| 79 | Asp Pro Thr Lys Ile Leu Glu Lys Thr Lys Ile Ser Thr Ser Ile Thr | |
| 80 | 305 310 315 320 | |
| 81 | aat tac ctt aat gtc tca acg gac cca gca acc ttc gtt cag gaa gct | 1069 |
| 82 | Asn Tyr Leu Asn Val Ser Thr Asp Pro Ala Thr Phe Val Gln Glu Ala | |
| 83 | 325 330 335 | |
| 84 | ctt cct aaa att ctt gag aac aca aaa gca gat ttc ttt aag agg att | 1117 |
| 85 | Leu Pro Lys Ile Leu Glu Asn Thr Lys Ala Asp Phe Phe Lys Arg Ile | |
| 86 | 340 345 350 | |
| 87 | att ggt cta cta aag gaa tca tca gag ata tgt tat agg gaa ata aag | 1165 |
| 88 | Ile Gly Leu Leu Lys Glu Ser Ser Glu Ile Cys Tyr Arg Glu Ile Lys | |
| 89 | 355 360 365 | |
| 90 | gaa aac aaa tat att acg tgt cct cac aag cca gaa gga tcg atg ttt | 1213 |
| 91 | Glu Asn Lys Tyr Ile Thr Cys Pro His Lys Pro Glu Gly Ser Met Phe | |
| 92 | 370 375 380 | |
| 93 | gta atg gtc aaa cta aac tta cat ctt ttg gag gag atc cat gac gac | 1261 |
| 94 | Val Met Val Lys Leu Asn Leu His Leu Leu Glu Glu Ile His Asp Asp | |

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96      ata gat ttt tgc tgc aag ctc gca aag gaa gaa tca gta att tta tgt 1309
97      Ile Asp Phe Cys Cys Lys Leu Ala Lys Glu Glu Ser Val Ile Leu Cys
98      405      410      415
99      cca ggg agt gtt ctt gga atg gaa aat tgg gtc cgt att act ttt gcc 1357
100     Pro Gly Ser Val Leu Gly Met Glu Asn Trp Val Arg Ile Thr Phe Ala
101     420      425      430
102     tgc gtt cca tct tct ctt caa gat gga ctc gaa agg gtc aaa tca ttc 1405
103     Cys Val Pro Ser Ser Leu Gln Asp Gly Leu Glu Arg Val Lys Ser Phe
104     435      440      445
105     tgt caa agg aac aag aag aag aat tct ata aat ggt tgt tagttgtaca 1454
106     Cys Gln Arg Asn Lys Lys Lys Asn Ser Ile Asn Gly Cys
107     450      455      460
108     caccctagtg tgtacatctg actgaagctg taaatcattt ctagttatcc cccatttata 1514
109     tattttcaata aaacatattg taatggttct gttgtagctg tccaagtcac gtactctact 1574
110     ttttgatgta tttggcctca ttgccttgca tcaatttcaa taaaaatggt tgtgtacacc 1634
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113     <211> LENGTH: 461
114     <212> TYPE: PRT
115     <213> ORGANISM: Hordeum vulgare
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120     20      25      30
121     Gly His Ala Ala Ala Ala Ala Val Glu Trp Asn Phe Ala Arg Gly Lys
122     35      40      45
123     Asp Gly Ile Leu Ala Thr Thr Gly Ala Lys Asn Ser Ile Arg Ala Ile
124     50      55      60
125     Arg Tyr Lys Ile Ser Ala Ser Val Glu Glu Ser Gly Pro Arg Pro Val
126     65      70      75      80
127     Leu Pro Leu Ala His Gly Asp Pro Ser Val Phe Pro Ala Phe Arg Thr
128     85      90      95
129     Ala Val Glu Ala Glu Asp Ala Val Ala Ala Ala Leu Arg Thr Gly Gln
130     100      105      110
131     Phe Asn Cys Tyr Ala Ala Gly Val Gly Leu Pro Ala Ala Arg Ser Ala
132     115      120      125
133     Val Ala Glu His Leu Ser Gln Gly Val Pro Tyr Lys Leu Ser Ala Asp
134     130      135      140
135     Asp Val Phe Leu Thr Ala Gly Gly Thr Gln Ala Ile Glu Val Ile Ile
136     145      150      155      160
137     Pro Val Leu Ala Gln Thr Ala Gly Ala Asn Ile Leu Leu Pro Arg Pro
138     165      170      175
139     Gly Tyr Pro Asn Tyr Glu Ala Arg Ala Ala Phe Asn Lys Leu Glu Val
140     180      185      190
141     Arg His Phe Asp Leu Ile Pro Asp Lys Gly Trp Glu Ile Asp Ile Asp
142     195      200      205
143     Ser Leu Glu Ser Ile Ala Asp Lys Asn Thr Thr Ala Met Val Ile Ile
144     210      215      220

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145      Asn Pro Asn Asn Pro Cys Gly Ser Val Tyr Ser Tyr Asp His Leu Ala
146      225                230                235                240
147      Lys Val Ala Glu Val Ala Arg Lys Leu Gly Ile Leu Val Ile Ala Asp
148                        245                250                255
149      Glu Val Tyr Gly Lys Leu Val Leu Gly Ser Ala Pro Phe Ile Pro Met
150                        260                265                270
151      Gly Val Phe Gly His Ile Ala Pro Val Leu Ser Ile Gly Ser Leu Ser
152                        275                280                285
153      Lys Ser Trp Ile Val Pro Gly Trp Arg Leu Gly Trp Val Ala Val Tyr
154                        290                295                300
155      Asp Pro Thr Lys Ile Leu Glu Lys Thr Lys Ile Ser Thr Ser Ile Thr
156      305                310                315                320
157      Asn Tyr Leu Asn Val Ser Thr Asp Pro Ala Thr Phe Val Gln Glu Ala
158                        325                330                335
159      Leu Pro Lys Ile Leu Glu Asn Thr Lys Ala Asp Phe Phe Lys Arg Ile
160                        340                345                350
161      Ile Gly Leu Leu Lys Glu Ser Ser Glu Ile Cys Tyr Arg Glu Ile Lys
162                        355                360                365
163      Glu Asn Lys Tyr Ile Thr Cys Pro His Lys Pro Glu Gly Ser Met Phe
164      370                375                380
165      Val Met Val Lys Leu Asn Leu His Leu Leu Glu Glu Ile His Asp Asp
166      385                390                395                400
167      Ile Asp Phe Cys Cys Lys Leu Ala Lys Glu Glu Ser Val Ile Leu Cys
168                        405                410                415
169      Pro Gly Ser Val Leu Gly Met Glu Asn Trp Val Arg Ile Thr Phe Ala
170                        420                425                430
171      Cys Val Pro Ser Ser Leu Gln Asp Gly Leu Glu Arg Val Lys Ser Phe
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174      450                455                460
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176      <211> LENGTH: 1910
177      <212> TYPE: DNA
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181      <222> LOCATION: (76)..(1728)
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185      Met Ala Thr Val Arg Gln Ser Asp Gly Val Ala Ala
186      1 5 10
187      aac ggc ctt gcc gtg gcc gca gcc gcg aac ggc aag agc aac ggc cat 159
188      Asn Gly Leu Ala Val Ala Ala Ala Asn Gly Lys Ser Asn Gly His
189      15 20 25
190      ggc gtg gct gcc gcc gtg aac ggc aag agc aac ggc cat ggc gtg gat 207
191      Gly Val Ala Ala Ala Val Asn Gly Lys Ser Asn Gly His Gly Val Asp
192      30 35 40
193      gcc gac gcg aac ggc aag agc aac ggc cat ggc gtg gct gcc gac gcg 255
194      Ala Asp Ala Asn Gly Lys Ser Asn Gly His Gly Val Ala Ala Asp Ala

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Input Set: I026400.RAW

| | | | | | |
|-----|---|------|-----|-----|--|
| 195 | 45 | 50 | 55 | 60 | |
| 196 | aac ggc aag agc aac ggc cat gcc gag gcc act gcg aac ggc cac ggc | 303 | | | |
| 197 | Asn Gly Lys Ser Asn Gly His Ala Glu Ala Thr Ala Asn Gly His Gly | | | | |
| 198 | 65 | 70 | 75 | | |
| 199 | gag gcc act gcg aac ggc aag acc aac ggc cac cgc gag agc aac ggc | 351 | | | |
| 200 | Glu Ala Thr Ala Asn Gly Lys Thr Asn Gly His Arg Glu Ser Asn Gly | | | | |
| 201 | 80 | 85 | 90 | | |
| 202 | cat gct gag gcc gcc gac gcg aac ggc gag agc aac gag cat gcc gag | 399 | | | |
| 203 | His Ala Glu Ala Ala Asp Ala Asn Gly Glu Ser Asn Glu His Ala Glu | | | | |
| 204 | 95 | 100 | 105 | | |
| 205 | gac tcc gcg gcg aac ggc gag agc aac ggc cat gcg gcg gcg gca | 447 | | | |
| 206 | Asp Ser Ala Ala Asn Gly Glu Ser Asn Gly His Ala Ala Ala Ala | | | | |
| 207 | 110 | 115 | 120 | | |
| 208 | gag gag gag gag gcg gtg gag tgg aat ttc gcg ggt gcc aag gac ggc | 495 | | | |
| 209 | Glu Glu Glu Glu Ala Val Glu Trp Asn Phe Ala Gly Ala Lys Asp Gly | | | | |
| 210 | 125 | 130 | 135 | 140 | |
| 211 | gtg ctg gcg gcg acg ggc gcg aac atg agc atc cgg gcg ata cgg tac | 543 | | | |
| 212 | Val Leu Ala Ala Thr Gly Ala Asn Met Ser Ile Arg Ala Ile Arg Tyr | | | | |
| 213 | 145 | 150 | 155 | | |
| 214 | aag atc agc gcg agc gtg cag gag aag ggc ccg cgg ccc gtg ctg ccg | 591 | | | |
| 215 | Lys Ile Ser Ala Ser Val Gln Glu Lys Gly Pro Arg Pro Val Leu Pro | | | | |
| 216 | 160 | 165 | 170 | | |
| 217 | ctg gcc cac ggc gac ccg tcc gtg ttc ccg gcc ttc cgc acg gcc gtc | 639 | | | |
| 218 | Leu Ala His Gly Asp Pro Ser Val Phe Pro Ala Phe Arg Thr Ala Val | | | | |
| 219 | 175 | 180 | 185 | | |
| 220 | gag gcc gag gac gcc gtc gcc gcc gcc gtg cgc acc ggc cag ttc aac | 687 | | | |
| 221 | Glu Ala Glu Asp Ala Val Ala Ala Ala Val Arg Thr Gly Gln Phe Asn | | | | |
| 222 | 190 | 195 | 200 | | |
| 223 | tgc tac ccc gcc ggc gtc ggc ctc ccc gcc gca cga agc gcc gtg gca | 735 | | | |
| 224 | Cys Tyr Pro Ala Gly Val Gly Leu Pro Ala Ala Arg Ser Ala Val Ala | | | | |
| 225 | 205 | 210 | 215 | 220 | |
| 226 | gag cac ctg tcg cag ggc gtg ccg tac atg cta tcg gcc gac gac gtc | 783 | | | |
| 227 | Glu His Leu Ser Gln Gly Val Pro Tyr Met Leu Ser Ala Asp Asp Val | | | | |
| 228 | 225 | 230 | 235 | | |
| 229 | ttc ctc acc gcc ggc ggc acc cag gcg atc gag gtc ata atc ccg gtg | 831 | | | |
| 230 | Phe Leu Thr Ala Gly Gly Thr Gln Ala Ile Glu Val Ile Ile Pro Val | | | | |
| 231 | 240 | 245 | 250 | | |
| 232 | ctg gcc cag acc gcc ggc gcc aac att ctg ctc ccc agg cca ggc tac | 879 | | | |
| 233 | Leu Ala Gln Thr Ala Gly Ala Asn Ile Leu Leu Pro Arg Pro Gly Tyr | | | | |
| 234 | 255 | 260 | 265 | | |
| 235 | cca aac tac gag gcg cgc gcc gcg ttc aac agg ctg gag gtc cgg cat | 927 | | | |
| 236 | Pro Asn Tyr Glu Ala Arg Ala Ala Phe Asn Arg Leu Glu Val Arg His | | | | |
| 237 | 270 | 275 | 280 | | |
| 238 | ttc gac ctc atc ccc gac aag ggc tgg gag atc gac atc gac tcg ctg | 975 | | | |
| 239 | Phe Asp Leu Ile Pro Asp Lys Gly Trp Glu Ile Asp Ile Asp Ser Leu | | | | |
| 240 | 285 | 290 | 295 | 300 | |
| 241 | gaa tcc atc gcc gac aag aac acc acc gcc atg gtc atc ata aac ccc | 1023 | | | |
| 242 | Glu Ser Ile Ala Asp Lys Asn Thr Thr Ala Met Val Ile Ile Asn Pro | | | | |
| 243 | 305 | 310 | 315 | | |
| 244 | aac aac ccg tgc ggc agc gtt tac tcc tac gac cat ctg tcc aag gtc | 1071 | | | |

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Input Set: I026400.RAW

Line ? Error/Warning

Original Text

378 W "N" or "Xaa" used: Feature required

gcngtngart ggaayttygc nmg

390 W "N" or "Xaa" used: Feature required

gcdatrtgnc craanacncc